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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,345	01/11/2002	Yasuaki Tanaka	991482A	6310

23850 7590 09/09/2003

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WASHINGTON, DC 20006

EXAMINER

KIM, PETER B

ART UNIT	PAPER NUMBER
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2851

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/042,345

Applicant(s)

TANAKA, YASUAKI

Examiner

Peter B. Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-89 is/are pending in the application.
- 4a) Of the above claim(s) 1-40, 50, 51 and 60-73 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 41-49, 52-59 and 74-89 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/469,229.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3, 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

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## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of Claims 41-49, 52-59 and 74-89 in Paper No. 6 is acknowledged.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 41-49, 52-59, and 74-89 are rejected under 35 U.S.C. 102(b) as being anticipated by Takanaga (JP6-204113).

Takanaga discloses a method for scanning exposure of a pattern formed on a mask (12) onto a substrate (14) through a projection optical system (13). The quantity of exposure light onto a wafer surface is controlled by using the variation information of transmittance (attenuation factor). An operation means determined the exposure light quantity into a substrate surface by using the variation information of the transmittance and measures the result of integrated light quantity from an integrated light quantity detector (see abstract). The operation system (19) stores the variation information of transmittance of the projection optical system (13) from the light dividing member (8) through the masking blade (10), lens (11) and reticle or mask (12) to the substrate (14). The operation means also determines the quantity of exposing light

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onto the substrate surface by using the variation information of transmittance and the measuring result from detector (17). Light source (1) emits ultraviolet rays ([0013] of translation).  $\phi$  represents the exposure correction value and, as seen in equation 2, is dependent on the time (tk-to) and on the means permeability (rate of pattern) of the reticle ( $R_r$ ). When exposing for the first time  $\phi$  is set to 1. The exposure correction value  $\phi$  changes every moment as it is computed and the exact light exposure is controlled by what is inputted on the basis of exposure correction value. The exposure is then stopped, t is set to T1 and  $\phi_1$  is computed. Exposure can then be started again and  $\phi_2$  calculated. By using the last exposure correction value and last elapsed time by the exposure history, the present exposure correction value is always computable. The method may be used in a step-and-repeat method ([0024]-[0030] of translation). As explained above, the fluctuation of attenuation factor of the projection optical system while the mask is moving relative to the energy beam is obtained.

Claims 41-49, 52-59 and 74-89 are rejected under 35 U.S.C. 102(e) as being anticipated by Takahashi (5,892,573).

Takahashi discloses a method for scanning exposure of a pattern formed on a mask (R) onto a substrate (W) through a projection optical system (10). A light quantity of a portion of exposure light from an illumination optical system is detected using a first light detecting means. A second light receiving means then detects the light quantity of exposure light passed through a transmitting portion of a movable stage. The first light receiving means is detected on a plane conjugate with the reticle, while the second light receiving means is conjugate with the wafer. The sensitivity of the first light detecting means is then corrected on the basis of detected values of first and second light receiving means,  $\delta$  corresponds to the transmissivity change in the

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illumination optical system and is stored in the calculating means as the sensitivity coefficient for the second step (col. 12, lines 1-17). The exposure process may be performed while scanning the reticle and the wafer. The exposure light comprises excimer laser light, such as deep ultraviolet light (col. 1, lines 26-27). (see col. 15, line 11 – col. 16, 63). Col. 11, lines 58-67 teach if the area of the transmissive portion of the circuit pattern of the mask is small, such as a contact hole, the transmissivity change of the projection optical system is small. For the sensitivity correction it may be sufficient to monitor only transmissivity variation of the illumination optical system. The exposure process may also comprise detecting a first ratio between the values of the first and second light receiving means in a state in which the reticle is not disposed in the path of the exposure light (interruption), detecting a second ratio between the detected values of the first and second light receiving means in a state when the reticle is disposed in the path of the exposure light and detecting a third ratio between the detected values of the first and second light receiving means in a state after at least one exposure process. The reticle is then disposed in the path of the exposure light and the sensitivity of the first light receiving means is corrected on the basis of the first second and third ratios. As explained above, the fluctuation of attenuation factor of the projection optical system while the mask is moving relative to the energy beam is obtained.

Claims 41-49, 52-59 and 74-89 are rejected under 35 U.S.C. 102(e) as being anticipated by Taniguchi (6,317,195).

Taniguchi discloses a method for scanning exposure of a pattern formed on a mask (R) onto a substrate (W) through a projection optical system (PL) comprising obtaining a fluctuation in an attenuation factor of projection optical system, which appears when the mask is moved and obtaining an attenuation factor of the optical system on the basis of a value of an entered energy

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entering into projection optical system through the mask during the scanning exposure and on the fluctuation in the attenuation factor. Taniguchi discloses a photoelectric sensor (28) for detecting the intensity of a light from the light source (1), and reflected light sensor (27), which receives light reflected by the wafer through the mask and the projection optical system. On col. 13, line 58 – col. 18, line 56, Taniguchi discloses obtaining the fluctuation in the attenuation factor while the mask is moving, the relative position of the mask and the energy beam (col. 13, line 58 – col. 14, line 19). Taniguchi discloses controlling an exposure quantity to be provided on the substrate taking into consideration the fluctuation (col. 14, line 29 – col. 15, line 33). Since the attenuation factor of the energy entering the projection optical system through the mask is calculated, it is inherent that the characteristic of transmittance of the mask is a function of the design data of the mask.

### ***Response to Arguments***

Applicant argues that references previously cited by the previous examiner in the parent application do not teach obtaining the fluctuation while the mask is moving; however, since the measurements are made during the scanning exposure in the cited references, the fluctuation due to the movement of the mask is obtained.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Kim whose telephone number is (703) 305-0105. The examiner can normally be reached on Monday-Thursday from 8:30 AM to 6:00 PM. The examiner can also be reached on alternate Fridays during the same hours.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on 703 308 2847. The fax phone numbers for the organization where this application or proceeding is assigned is 703 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 306- 3431.

A handwritten signature in black ink, appearing to read 'Peter B. Kim', with a stylized flourish at the end.

Peter B. Kim  
Patent Examiner  
August 29, 2003